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**Amendments to the Claims:**

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (Currently Amended) A high-speed signal processor which functions as a waveform acquisition system and a high-speed analog-to-digital converter, said processor comprising:

a filter system, comprising an M-band filter bank, for dividing a single input signal into a series of adjacent frequency bands;

a frequency down converter for down converting one or more of the adjacent frequency bands as they are output from said filter system;

a digitizer for digitizing each frequency band output from said filter system; and  
a system for reconstructing the original input signal;

wherein the M-band filters in said M-band filter bank enable perfect reconstruction, meaning that the sum of the cascaded responses of the M-band analysis filters followed by the synthesis filters produces an overall flat amplitude response and group delay.

2. (Canceled)

3. (Canceled)

4. (Canceled)

5. (Currently Amended) The high-speed signal processor as recited in Claim 3 17, wherein the M-band filters in said M-band filter bank are implemented optically using fiber optics.

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6. (Currently Amended) The high-speed signal processor as recited in Claim ~~3~~ 17, wherein the M-band filters in said M-band filter bank are implemented electronically.

7. (Currently Amended) The high-speed signal processor as recited in Claim ~~3~~ 17, wherein the M-band filters in said M-band filter bank are implemented using software.

8. (Currently Amended) The high-speed signal processor as recited in Claim ~~3~~ 17, wherein each channel output is equalized, to thereby shape the transfer function of the channel into that of an M-band filter.

9. (Original) The high-speed signal processor as recited in Claim 8, wherein the channel equalization is implemented with Weiner filter technology.

10. (Original) The high-speed signal processor as recited in Claim 1, wherein a calibration signal is continuously injected into said processor to serve as a reference for quantifying and removing hardware errors.

11.- 16. (Canceled)

17. (Previously Presented) A high-speed signal processor which functions as a waveform acquisition system and a high-speed analog-to-digital converter, said processor comprising:

- a filter system for dividing an input signal into a series of adjacent frequency bands, comprising an M-band filter bank;
- a digitizer for digitizing each frequency band output from said filter system; and
- a system for reconstructing the original input signal;

wherein the M-band filters in said M-band filter bank enable perfect reconstruction, meaning that the sum of the cascaded responses of the M-band analysis filters followed by the synthesis filters produces an overall flat amplitude response and group delay.